

(12) UK Patent Application (19) GB (11) 2 269 998 (13) A

(43) Date of A Publication 02.03.1994

(21) Application No 9317594.1

(22) Date of Filing 24.08.1993

(30) Priority Data

(31) 04059281

(32) 24.08.1992

(33) JP

(51) INT CL⁵
A61F 13/15

(52) UK CL (Edition M)
A5R RPG

(56) Documents Cited
US 4641381 A

US 4244367 A

(58) Field of Search
UK CL (Edition L) A5R RPG RPL
INT CL⁵ A61F 13/15
Online database: WPI

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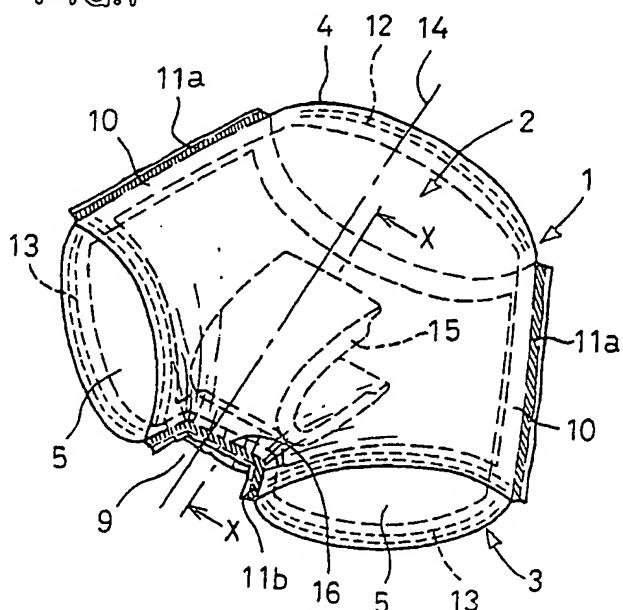
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(54) Disposable absorbent pants

(57) Disposable absorbent pants comprise front and rear panels 2, 3 which are placed one upon another and welded together along laterally opposite side edges 11a as well as along a crotch zone 11b to form a basic structure 1 of pants. Each of the front and rear panels 2, 3 comprises a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid absorbent panel sandwiched therebetween. An U-shaped auxiliary liquid-absorbent panel 15 is secured within the basic pants structure to overlie the crotch zone, whereby liquid excretion can be effectively prevented from leaking out along laterally opposite side edges of the crotch zone.

FIG. I



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FIG.2

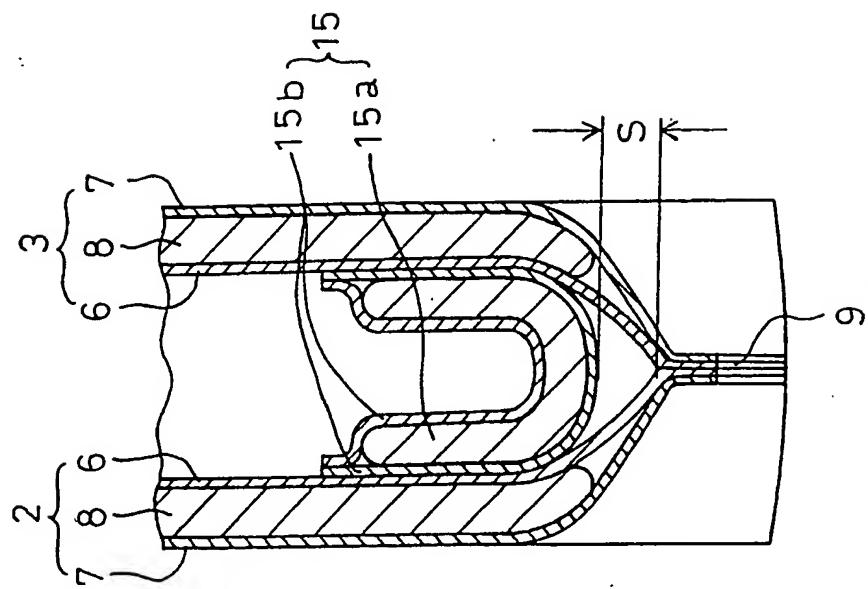
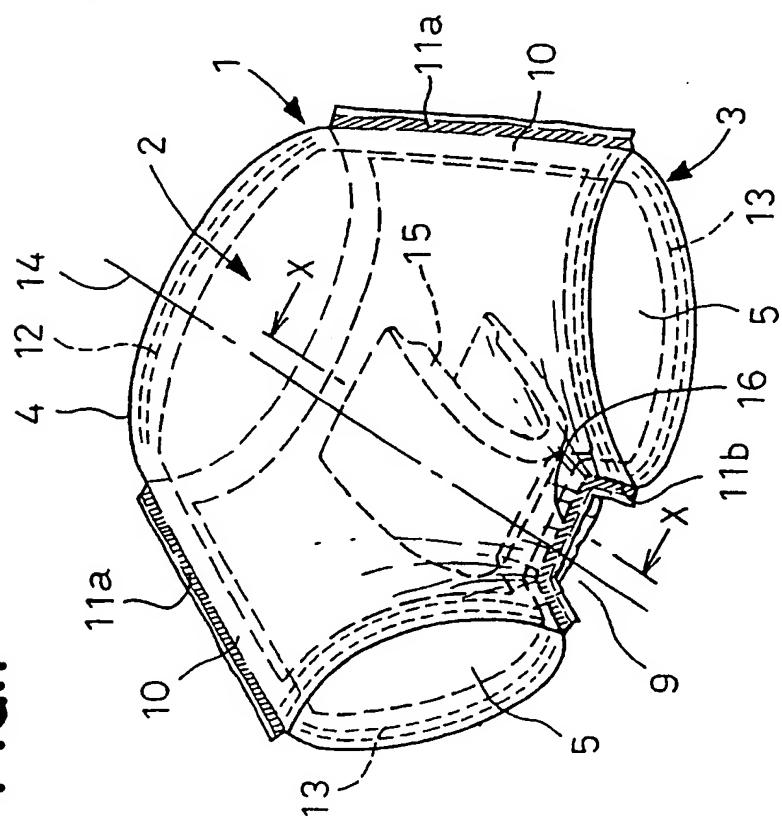


FIG.1



DISPOSABLE ABSORBENT PANTS

The present invention relates to absorbent pants such as disposable diapers.

Pants type disposable diaper is well known, for example, from Japanese Patent Gazette No. 1992-42017. Referring to Figs. 10 and 11 of this patent gazette, this diaper of prior art comprises a laminate consisting of a liquid-permeable topsheet cut to be longer sideways, a liquid-impermeable backsheet also cut to be longer sideways and a liquid-absorbent panel sandwiched therebetween, and an elastic member extending along one of longitudinally opposite edges of the laminate around a waist opening as well as elastic members extending along the other edge around respective leg-openings, wherein said laminate is transversely folded in two, edges of the laminate thus folded opposite to the fold are bonded together and edges of cutouts formed at a middle position of the laminate's lower end are also bonded together so as to define a crotch zone.

While the diaper disclosed in the above-identified patent gazette provides a good fitting to the wearer's crotch because the diaper is formed in the crotch zone with the cutout so as to assure that the leg-openings are located

below the bottom surface of the crotch zone, a central area of the crotch zone contains no liquid-absorbent panel and therefore it is difficult to prevent liquid excretion from leaking out along laterally opposite side edges of the crotch zone.

Accordingly, it is a principal object of the invention to provide an improved pants type diaper comprising front and rear bodies separately formed and bonded together so that a liquid-absorbent panel covers also a bonding line in the crotch zone of the front and rear bodies.

To achieve the object set forth above, the invention resides in disposable absorbent pants comprising front and rear bodies each consisting of a liquid-permeable topsheet, a liquid-impermeable backsheet and liquid-absorbent panels, sandwiched therebetween and assembled to form pants, having a waist-opening as well as leg-openings, and circumferentially stretchable elastic members attached around the respective openings, characterized in that said front and rear bodies are separately formed, each of said panels being dimensioned so that said top- and backsheets have their outer peripheral edges extending outward beyond outer peripheral edges of the respective panels, the respective outer peripheral edges of said top- and

backsheets being bonded together along the outer peripheral edges thereof, and the respective bodies are bonded together along the middle of their lower edges to define a crotch zone as well as along laterally opposite side edges, thus forming a basic structure of the pants; and an auxiliary liquid-absorbent panel curved in a U-shape is bonded at least at top ends of this U-shape to an inner surface of said basic structure in the crotch zone.

Preferably, said crotch zone defined by said convexly curved welding line is formed along its outer edges with a correspondingly curved cutout.

With the pants constructed according to the invention as outlined above, the crotch zone is reliably centered to the wearer's crotch and laterally opposite sides of the crotch zone cover at least inner sides of the wearer's thighs, respectively. The crotch zone also contains the liquid-absorbent panel and therefore liquid excretion is effectively absorbed also in this zone.

The invention will be described by way of example with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view showing an embodiment of a diaper constructed according to the teachings of the invention; and

Fig. 2 is a sectional view taken along a line X-X in Fig. 1.

Referring to Fig. 1 and 2, a diaper's basic structure 1 generally comprises front and rear bodies 2, 3 assembled in the form of pants having a waist-opening 4 and a pair of leg-openings 5. Each of front and rear bodies 2, 3 comprises a liquid-permeable topsheet 6, a liquid-impermeable backsheet 7 and a liquid-absorbent panel 8 sandwiched between said top- and backsheets 6, 7.

Lower ends of front and rear bodies 2, 3 are formed at middle positions with cutouts 9 defining a crotch zone. The front and rear bodies 2, 3 are welded together along heat or supersonic welding lines 11a, 11b extending parallel with the cutouts 9 and the laterally opposite side edges 10, respectively, so as to leave narrow edges of these cutouts 9 and opposite side edges not welded. A size, shape and curvature radius of the welding line 11b may be appropriately selected depending on whether the diaper is for adult or for baby so far as the welding line 11b is convexly curved toward waist lines of the front and rear bodies 2, 3 and at least inner sides of respective leg-openings 5 extend downward beyond an apex 16 of the convexly curved welding line 11b.

Circumferentially stretchable elastic members 12, 13 are interposed between respective edges of top- and backsheets 6, 7 extending beyond the panel 8 around a waist-opening and leg-openings, respectively, and said edges are closed together by hot melt type adhesive or said welding means. Laterally opposite side edges of top- and backsheets 6, 7 extending beyond the panel 8 are also closed together in the similar manner.

The laterally opposite side edges and the lower edges around the respective leg-openings of the front and rear bodies are illustrated as extending neither parallel with nor perpendicularly to a vertical axis 14. These side edges may however extend parallel with the vertical axis 14 and these lower edges around the respective leg-openings may extend perpendicularly to said vertical axis 14 within the scope of the invention.

The diaper's basic structure 1 is provided on the top surface of its crotch zone with an auxiliary liquid-absorbent panel 15 which is elongate longitudinally of the diaper's basic structure 1. The auxiliary panel 15 comprises a liquid-absorbent core 15a covered with liquid-permeable sheets 15b and is bonded at least at longitudinally opposite ends to the top surface of the topsheet 6 with means of adhesive so as to be curved in a U-shape. With the diaper's basic structure 1 being put on

a wearer, the auxiliary panel 15 is curved in a U-shape together with the diaper's basic structure 1. The auxiliary panel 15 is preferably bonded to the diaper's basic structure 1 in a manner such that the auxiliary panel 15 thus curved floats above the top surface of the basic structure's crotch zone and more specifically the curved auxiliary panel 15 has its outer bottom spaced by a distance S of at least 10 mm from the top surface of the basic structure's crotch zone. However, it is also possible within the scope of the invention to arrange the auxiliary panel 15 so that the bottom of the auxiliary panel 15 may remain in contact with the top surface of the diaper's crotch zone even in the curved state. The auxiliary panel 15 may have its bottom layer comprising a liquid-impermeable sheet and/or have stretchable side flaps extending from laterally opposite sides thereof without departure from the scope of the invention.

Components of the diaper 1 may be made from materials commonly used in well known diapers. For example, the topsheet 6 may be made of nonwoven fabric, the backsheet 7 may be made of plastic film, the panel 8 may be made of fluff pulp mixed with superabsorbent polymer, the elastic members 12, 13 may be made of natural or synthetic rubber. The core 15a of the panel 15 may be made of fluff pulp mixed with superabsorbent polymer and the sheet 15b

covering the core 15a may be made of nonwoven fabric, preferably stretchable nonwoven fabric.

With the diaper constructed according to the invention as described above, provision of the auxiliary liquid-absorbent panel over the crotch zone allows the crotch zone to absorb liquid excretion sufficiently to prevent any liquid excretion from leaking along the laterally opposite side edges of the crotch zone.

CLAIMS

1. Disposable absorbent pants comprising front and rear bodies each comprising a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent panel sandwiched therebetween and assembled to form pants having a waist-opening as well as a pair of leg-openings, and circumferentially stretchable elastic members attached around the respective openings, wherein:

 said front and rear bodies are separately formed, each of said panels being dimensioned so that said top- and backsheets have their outer peripheral edges extending outward beyond outer peripheral edges of the respective panels,

 said top- and backsheets being bonded together along the outer peripheral edges thereof, and the respective bodies are bonded together along the middle of their lower edges to define a crotch zone as well as along laterally opposite edges, thus forming a basic structure of the pants; and

 an auxiliary liquid-absorbent panel curved in a U-shape is bonded at least at top ends of this U-shape to an inner surface of said basic structure so that said auxiliary panel is located over said crotch zone.

2. Disposable absorbent pants according to Claim 1, wherein said crotch zone is defined by a convexly curved welding line and is formed along its outer edge with a

correspondingly curved cutout.

3. Disposable absorbent pants as claimed in Claim 1 or 2, wherein said curved auxiliary panel is spaced from the top surface of said crotch zone.

4. Disposable absorbent pants as claimed in Claim 1 or 2, wherein said curved auxiliary panel is arranged so that it remains in contact with the top surface of said crotch zone.

5. Disposable absorbent pants substantially as herein described with reference to the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report)

Application number
GB 9317594.1

Relevant Technical Fields	Search Examiner R J WALKER
(i) UK Cl (Ed.L) A5R (RPG, RPL)	Date of completion of Search 4 NOVEMBER 1993
(ii) Int Cl (Ed.5) A61F 13/15	Documents considered relevant following a search in respect of Claims :- 1-5

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
A	US 4641381	(HERAN ET AL) see column 6 lines 11-22 and Figure 9	1
A	US 4244367	(ROLLENHAGEN) see entire document	1

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).